

Claims

1. A basic vector for preparing a TCR expression vector, which possesses an expression control sequence operatively linked to a polycistronic expression unit comprising:
- (a) at least a part of the nucleotide sequence encoding a C region of the TCR $\alpha$  chain, with at least one restriction cleavage site being located in the 5' region of the nucleotide sequence, and
- (b) at least a part of the nucleotide sequence encoding a C region of the TCR $\beta$  chain, with at least one restriction cleavage site being located in the 5' region of the nucleotide sequence.
2. A vector as claimed in claim 1, characterized in that it can be propagated in eukaryotic cells.
3. A vector as claimed in claim 1 ~~or 2~~, characterized in that it is a plasmid.
4. A vector as claimed in ~~one of the preceding claims~~ <sup>claim 1</sup>, characterized in that it is a vector which can be replicated episomally.
5. A vector as claimed in ~~one of the preceding claims~~ <sup>claim 1</sup>, characterized in that the expression unit additionally contains a sequence which allows the polycistronic transcription product to be translated in a capping-independent manner.
6. A vector as claimed in claim 5, characterized in that the expression unit contains an IRES sequence.
7. A vector as claimed in ~~one of the preceding claims~~ <sup>claim 1</sup>, characterized in that the expression unit

allows an expression of the TCR $\alpha$  chain which is limited as compared with expression of the TCR $\beta$  chain.

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5 8. A vector as claimed in ~~one of the preceding~~ <sup>claim 1</sup>  
~~claims~~, characterized in that the C regions of the  
TCR $\alpha$  and TCR $\beta$  chains are of human origin.

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a 10 9. A vector as claimed in ~~one of the preceding~~ <sup>claim 1</sup>  
~~claims~~, characterized in that at least one of the  
restriction cleavage sites located in the 5'  
region of the nucleotide sequences encoding the C  
regions of the TCR $\alpha$  and TCR $\beta$  chains is unique.

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9 15 10. A vector as claimed in ~~one of the preceding~~ <sup>claim 1</sup>  
~~claims~~, characterized in that the restriction  
cleavage sites do not result in any amino acid  
substitution in the C regions.

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a 20 11. A vector as claimed in ~~one of the preceding~~ <sup>claim 1</sup>  
~~claims~~, characterized in that a BamHI cleavage  
site and/or an XmaI cleavage site is/are located  
in the 5' region of the DNA sequence encoding the  
C region of the TCR $\alpha$  chain.

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a 25 12. A vector as claimed in ~~one of the preceding~~ <sup>claim 1</sup>  
~~claims~~, characterized in that a SpeI cleavage site  
and/or a SalI cleavage site is/are located in the  
5' region of the DNA sequence encoding the C  
30 region of the TCR $\beta$  chain.

35 13. A TCR expression vector, which possesses an  
expression control sequence operatively linked to  
a polycistronic expression unit comprising:  
(a) a nucleotide sequence encoding a complete  
TCR $\alpha$  chain and  
(b) a nucleotide sequence encoding a complete  
TCR $\beta$  chain,

with the nucleotide sequences encoding the V regions and C regions of the TCR chains being linked to each other by way of restriction cleavage sites in the 5' region of the C regions.

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14. A TCR expression vector as claimed in claim 13, characterized in that the nucleotide sequences encoding the TCR chains possess at least one base substitution, as compared with the natural TCR sequence, in the region of the restriction cleavage sites, with the base substitutions being selected within the context of the degeneracy of the genetic code.

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15. A process for preparing a TCR expression vector as claimed in claim 13 or 14, comprising the steps of:

- (a) preparing a basic vector as claimed in one of claims 1 to 12, and
- 20 (b) inserting nucleotide sequences which contain the regions encoding a desired V region of a TCR $\alpha$  or TCR $\beta$  chain into the restriction cleavage sites which are located in the 5' regions of the nucleotide sequences encoding the C regions, or
- 25 (a') preparing two vectors, each of which contains at least a part of the nucleotide sequence encoding the C region of the TCR $\alpha$  chain or the TCR $\beta$  chain, respectively, with at least one restriction cleavage site being located
- 30 in the 5' region of the nucleotide sequence,
- (b') inserting nucleotide sequences which contain the regions encoding a desired V region of a TCR $\alpha$  chain or the TCR $\beta$  chain into the
- 35 restriction cleavage sites which are located in the 5' regions of the nucleotide sequences encoding the C regions, and

(c') assembling the nucleotide sequences encoding the TCR chains in order to obtain a TCR expression vector.

5 16. A cell, characterized in that it is transformed with a basic vector as claimed in ~~one of claims 13 to 13.~~ <sup>claim 1</sup>

10 17. A cell, characterized in that it is transformed with a TCR expression vector as claimed in ~~one of claims 13 to 14.~~ <sup>claim 13</sup>

18. A cell as claimed in claim 17, characterized in that it is a mammalian cell.

15 19. A cell as claimed in claim 17 ~~or 18~~, characterized in that it is able to express one or more accessory molecules.

20 20. A cell as claimed in ~~one of claims 17 to 19,~~ <sup>claim 17</sup> characterized in that the accessory molecules are selected from the group consisting of CD3, CD4, CD8 and cytokines such as IL-2 and/or TNF.

25 21. A cell as claimed in ~~one of claims 17 to 20,~~ <sup>claim 17</sup> characterized in that it is a human T cell.

30 22. A cell as claimed in ~~one of claims 17 to 21,~~ <sup>claim 17</sup> characterized in that it is selected from the T cell clones and T cell lines 234, molt-4, Peer and Jurkat and variants thereof.

35 23. A process for expressing a T cell receptor, characterized in that a suitable host cell is transformed with an expression vector as claimed in claim 13 ~~or 14~~ and the cell is cultured under conditions which lead to the T cell receptor being expressed.

24. A reagent kit for preparing a TCR expression vector, comprising

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(a) a basic vector as claimed in ~~one of claims 1 to 12~~ <sup>claim 1</sup>, and

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(b) primers for amplifying V regions of the TCR $\alpha$  and TCR $\beta$  chain genes.

25. A reagent kit for preparing a TCR expression vector, comprising

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(a) two separate vectors containing the elements of the expression unit from a basic vector as claimed in ~~one of claims 1 to 12~~ <sup>claim 1</sup>, and

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(b) primers for amplifying V regions of the TCR $\alpha$  and TCR $\beta$  chain genes.

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26. A reagent kit as claimed in claim 24 ~~or 25~~, which additionally comprises a recipient cell which is suitable for TCR expression.

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